As shown in FIG. **1**, the terminal ends of each of the chambers **16** are exposed, creating an open channel between the front and rear of the apparatus. The chambers **16** allow for easy cleaning, e.g., flushing with a solvent such as water.

As shown in FIG. **3**, both the upper pin portion **31** and the lower pin portion **32** of each pin **30** is preferably a molded plastic part of solid cylindrical form. Of course, metal and other structural materials may be substituted for plastic in this application. The upper pin portion **31** is formed with a circular central flange comprising a top shoulder **34** and an upper medial shoulder **35**, while the lower pin portion **32** also is formed with the central flange comprising a lower medial shoulder **36** and a bottom shoulder **37**. An upper body **33** extends upwardly from the top shoulder **34** and terminates with a hemispherical cap **33**A while an upper medial body **39**A extends downwardly from the upper medial shoulder **35**, and both body **33** and body **39**A are aligned coaxially. Likewise, a lower medial body **39**B extends upwardly from the lower medial shoulder **36** while a lower body **38** extends downwardly from the bottom shoulder **37** and both body **39**B and body **38** are aligned coaxially. The shoulders **34**, **35**, **36**, and **37**, form the central flanges as stated, and both have a diameter greater than that of the upper body **33**, upper medial body **39**A, lower medial body **39**B and lower body **38**. Preferably, the top shoulder **34** is rounded as shown in FIG. **3**. Having a rounded top shoulder **34** provides an improved contact between upper pin portion **31** and the interior surface **18** of upper deck **10** which limits upward translation of the pin **30**. In addition, this feature facilitates self-alignment of the pins **30**.

The compressible element **40** joins the upper **31** and lower **32** portions of pin **30**. Element **40** is preferably a conventional compression coil spring, as shown in FIG. **3**, but may also be, for instance, an elastomeric material with a form factor matching, positioned between, and joining the upper and lower portions **31** and **32**. Element **40** preferably has squared and ground terminal ends **41** and **42** and is press fit onto the upper medial body **39**A and the lower medial body **39**B as shown in FIG. **2** with the ground ends **41** and **42** in contact with the upper medial shoulder **35** and lower medial shoulder **36** respectively, thereby forming an inseparable assembly of the three parts **31**, **32**, and **40**.

As shown in FIG. **2**, each one of the Braille pins **30** can be positioned in one of two mutually exclusive states: extended or retracted. Translation between these two states is accomplished using an actuator device such as cog-wheel **50** shown in FIG. **2**, for instance, or linear actuator **52**, shown in FIG. **4**. The actuator devices are located directly below the lower deck **20** within housing **25** and move pins **30** by applying forces to lower body **38** of the pin **30**. The linear actuator **52** may be engaged with lower body **38** in order to force pin **30** upward and also downward, or if not engaged, pin **30** may move downward under the force of gravity when linear actuator **52** retracts, as shown at the left in FIG. **4**.

The functionality of the present invention is independent of the actuator devices used; thus, a variety of different actuator devices, as, for instance, shown and described in the above prior art, can be integrated with the present invention and achieve comparable results.

Due to the relatively small dimensions of the operational components comprising a tactile display, commonly used actuator devices may not be robust. Therefore, the actuator devices must be protected from damage by relatively large forces transmitted through the tactile pins **30**, as demonstrated by the right pin in FIG. **2**. Such a force may be, for instance, due to a heavy object placed on the reference surface **14** of the upper deck **10** while some pins **30** are in the extended state. To avoid such damage, the compressible element **40** of each one of the Braille pins **30** allows the pins **30** to compress when force "F" (FIG. **2**) is greater then typical forces applied during tactile reading. Once force "F" is removed, the compressible element **40** returns to its nominal extension.

As shown in FIG. **4**, the actuators **52** may be operated by a DC power supply **60** which is controlled by a microprocessor or computer **62** in accordance with a program for presenting upwardly extended pins **30** for tactile reading.

The enablements described in detail above are considered novel over the prior art of record and are considered critical to the operation of at least one aspect of the apparatus and its method of use and to the achievement of the above described objectives. The words used in this specification to describe the instant embodiments are to be understood not only in the sense of their commonly defined meanings, but to include by special definition in this specification: structure, material or acts beyond the scope of the commonly defined meanings. Thus if an element can be understood in the context of this specification as including more than one meaning, then its use must be understood as being generic to all possible meanings supported by the specification and by the word or words describing the element.

The definitions of the words or drawing elements described herein are meant to include not only the combination of elements which are literally set forth, but all equivalent structure, material or acts for performing substantially the same function in substantially the same way to obtain substantially the same result. In this sense it is therefore contemplated that an equivalent substitution of two or more elements may be made for any one of the elements described and its various embodiments or that a single element may be substituted for two or more elements in a claim.

Changes from the claimed subject matter as viewed by a person with ordinary skill in the art, now known or later devised, are expressly contemplated as being equivalents within the scope intended and its various embodiments. Therefore, obvious substitutions now or later known to one with ordinary skill in the art are defined to be within the scope of the defined elements. This disclosure is thus meant to be understood to include what is specifically illustrated and described above, what is conceptually equivalent, what can be obviously substituted, and also what incorporates the essential ideas.

The scope of this description is to be interpreted only in conjunction with the appended claims and it is made clear, here, that each named inventor believes that the claimed subject matter is what is intended to be patented.

What is claimed is:

1. A Braille reader apparatus comprising:

an upper and a lower spaced apart deck having a plurality of axially aligned aperture pairs and a reference surface of the upper of the spaced apart decks;

a plurality of Braille pins, each one of the Braille pins axially aligned with one of the aperture pairs and in mutual engagement therewith;

each one of the Braille pins having a compressible element joined in mutual axial alignment with and positioned between an upper pin portion, and a lower pin portion, wherein the pin portions are spaced apart and non-contacting, the pin portions separately movable in independent linear motion controlled by the compressible elements and the aperture pairs;

wherein, the upper pin portions extend above the reference surface when the lower pin portions are moved in a first direction, and the upper pin portions are retracted below